

Encouragement 15.
A Scheme of Learning Propos'd to be Taught in the Royal Schole, for the Real Improvement and Advancement of Useful Navigation, Humbly Submitted, &c. That from Its Candid, and Beneficial Intention, This Great and Good Work may Deserve the Encouragement of This Honorable House.

THIS Institution being Calculated to the Perpetual Honor, and Advantage of *England*, for the Free Education of a Certain Number of Gentlemen's Sons, in a more Useful, Polite, and Comprehensive Degree of Naval Knowledge and Instruction than hath been hitherto, (so far as any thing appears,) in any Time, or Place Attempted; In Order towards Fitting them for the Service of the Public, and Advantage of their Familys: It will be Suitable and Necessary, that the Foundation of this Undertaking shou'd be Sufficiently Larg: To Answer as well the Capacities and Qualities of those that are to be Educated, as to take in the Full Extent and Scope of that Education which is thereby intended.

Navigation

In its True Extension, is that Marine, and Naval Science, which Comprehends whatever has Relation, either to Ships, or to the Seas whereon they Move, in order to the Perfecting a Prosperous Voyage, or Navigation of what sort soever. Some Particulars whereof are these that follow; *viz.* The Fabrication, Expence, and Uses of a Ship, and of its several Parts. The Knowledge of Sea-Coasts, Banks, Sands, and Harbors; Tides, Winds, Tornado's, Hurricanes; The Naval Direction and Government of a Ship at Sea; Naval Oeconomie, with the Laws and Customs of the Sea, Civil and Military. An Exact Knowledge of the Motions of the Sun and Moon, and of such Instruments as are properly and commonly made use of in Cœlestial Observations, Relating to the Sea. The Construction, Management, and Application of Machines imploy'd in Naval Services; with Sufficient Knowledge concerning the Effects resulting from them. The Conducting and Directing Fleets, so far as may be taught in Scholes. With divers other Useful Naval Speculations.

But Common Scholes in a more Narrow Method Teach

1. The Care and Skill of Conducting a Ship or Vessel well, into, or out of a River, Road, or Harbor; (called *Pilotage*). 2. The Knowledge of the Mariner's Compass; Of Soundings, Lands, Points, Distances, Depths of Water, Shoals, Sands; the Qualities of Grounds and Streams; the Point of the Compass whereon the Moon makes High-water in several Places, and the like; (called *Coasting-Navigation*). 3. The Direction of a Ship's Way from One Port, or Part of the World, to Another, separated by One Sea, or More; Keeping an Account of the Ship's Movement on the Surface of the Sea according to the Methods of *Plain-Sailing*, *Mercator's Sailing*, or *Great Circle-Sailing*; The being able by Cœlestial Observations to Correct such Errors as unavoidably will happen when those Observations are wanting; An Exact Knowledge of the Ship's Place at all Times, and what Course and Distance she must sail to Arrive at an intended Port or Place. These Things, with some Few more, are generally Esteem'd, and Taught for Navigation: But are indeed, scarce all the Virtues of one Good Officer. To wit, the Pilot, or Master of the Ship.

Therefore that the End for which this Naval Education is Design'd, may not be Disappointed, by taking in too Few Particulars, and that the Institution may be Competently General, and Useful to the Public; The Arts, Sciences, and Languages hereafter mention'd, are Propos'd, in this Schole, to be Sufficiently and Accurately Taught, *viz.*

Elementary

1. **Geometry.** Elementary, and Practical, for so much as Relates to drawing Schemes.
2. **Arithmetic.** In all the Usual Necessary Parts thereof, *viz.* In Whole Numbers; Fractions Vulgar, and Decimal: Extraction of Roots; Construction and Use of Logarithmical Tables, &c. according to the Practices of all known Trading Nations.
3. **Algebra.** With the Application thereof in Arithmetic, and Geometry; so far at least, as to perfection in Quadratic Equations.
4. **Mechanics.** Or that part of Geomety, which Treating of Motion, Contemplates according to Geometrical Rules, by what Force, and in what Time, any (possible) Motion may be perform'd: With the Construction and Application of Machines and Powers, proper and in use, for moving Heavy Bodies, *viz.* The Ballance, Leaver, Axis in Peritrochio, Pulley, Wedg, Screw, &c.
5. **Statics.** A Science treating of Heavy Bodies; their Weight, Centers of Gravitation, Equilibration, &c.
6. **Hydrostatics.** The Art or Science of weighing Liquids; or Solid Bodies in Liquids: And comparing one with another, &c.
7. **Surveying of Land.** The End of this Art being to find the Area, or Superficial Content of some Quantitie or Parcel of Ground contain'd within one Hedg or Limit, (or if within many, yet such as Ultimately terminat in one.) The Art it self may seem to be Remote from Navigation. But passing successively by all the Bendings of an Inclosure; and taking, by the help of a *Circumferentor*, the Position of every Hedg or Limit with that immediately before and after it; together also with the Length of each Hedg or Limit by the *Chain*; And lastly joyning these Orderly together, by the help of a *Scale of Equal Parts*, and a *Protractor*: This Method of proceeding in Surveying, is, truely neither more nor less than keeping an Account at Sea of a Ships several Courses, and the Distances sail'd thereon: And laying down from thence, the several Traverses upon a Chart or otherwise; for finding out the true Place of a Ship at any Time, and what depends thereon. And this is Noted here, in regard that Surveying, Fortification, and divers other Arts and Sciences which seem not to Relate to *Navigation*, are nevertheless Essentially subservient thereto.
8. **Fortification, or Military Architecture.** That is, the Art of joyning certain Lines together at the Angles of a *Polygon*, in such a manner, that Walls, or Banks, or Both, being built according to the Measures of those Lines and Angles: The Place, whether Town, Citadel, Fort, &c. may thereby be Render'd so Secure, that a competent Number of Men with Ammunition, may be capable of Resisting, with advantage, a more considerable Army. To this may be added the Methods of Encamping Armies, and Besieging Garrisons, &c.
9. **Castrametation, or Encampments, &c.**
9. **Perspective.** Or the Art of Representing Natural Objects on a Plane, by the help of a Ruler and Compasses, in like manner as they appear to the Sight under any Situation or Position.
10. **Drawing.** Which performs like Operations as Perspective, by Observation, and the Power of Imitation; join'd with an Habit of the Hand, acquired by Care, and Exercise, and is perform'd, for the most part, without Ruler and Compasses.
11. **Trigonometry Elementary and Practical.** Or the Doctrine of Triangles, Right-lin'd and Spherical: With the Construction and Use of the Tables of Sines, Tangents, and Secants, Natural and Logarithmical; and of divers Useful Instruments Constructed from these Tables. Being the Art of Measuring Triangles with regard to their Sides and Angles only. Being a part of Mathematical Learning so Useful and Necessary, that without it Practical Geometry, Astronomy, Dialing, Geography, Fortification; the Direction and Knowledge of a Ships Way in the Sea, with divers other Disciplines, Mathematical and Nautical, can in no wise be competently understood.

Taking

12. **Practical Geo-** Taking Heights, and Distances, by the help of Instruments and Tables ;
metry. And finding the Contents of Superficies, and Solid Bodies.
13. **Use of Globes,** The Use of Globes Cœlestial and Tereſtrial ; of Sphares, Quadrants, Sectors,
Sphaeres, &c. Scales, and other Mathematical Instruments relating to the Sea, and in frequent
Use with Navigators.
14. **Mapps, and** The Projection of the Sphere in *Plano*, the Delineation and Use of Mapps,
Sea-Charts, Draughts of Harbors, Roads, Bays, &c.
of Harbors, &c.
15. **Astronomy.** That is, so much thereof as pertains to the Situations, Orders, Motions,
Magnitudes, Distances ; with other Accidents, and Phænomena, Relating to
the Sun, Moon, and Fixed Stars.
16. **Chronography.** Or the Doctrine of Times. So far at least ; as the Knowledg thereof
Relates to Time, Consider'd as it is the Measure of the Duration of Things,
taken from the Motions of Cœlestial Bodies. The Political Distribution of
Time into Years, Months, Weeks, Days, &c. and of their several Kinds,
according to the Usage and Customs of Divers Countryrs.
27. **Calendars.** The Explication, Construction, and Use of Calendars, Antient and Mo-
dern ; *Julian and Gregorian*, &c. Whereto may be added, The Principles
upon which the most useful and proper *Automata*, or Self-Movers, are Fa-
bricated. As *Watches, Pendulums, Clepsydra*, with other Measures of Time,
and Motion.
18. **Geography.** A Science Teaching the Constitution, Division, Description, Dimension,
Representation, and other Affections of the Terraqueous Globe : As Figure,
Place, and Magnitude ; Continents, Regions, Kingdoms, Provinces, Islands,
Cherſoneſus's, and Isthmus's ; Mountains, Promontarys ; Seas, Rivers, Lakes ;
Zones, Climates, Parallels, &c. into which it is divided ; With divers other
Matters unto each respectively pertaining.
19. **Architecture** The Art of Building Well : That is, with Respect to Duration, Regula-
Civil and Naval. rity, and Commodiousness. This consists very much in assigning to each
Member of an Edifice, a Just Proportion and Bigness, together with a pro-
per Disposition or Placing all the Parts thereof according to their Uses, and
Appointments. And these Qualifications are no where more needful to be
understood and heeded, than in Building Ships of War : Because in them,
The Men, Provisions, Stores, Good Properties for Fighting, Working in a
Storm, &c. shou'd rather Find, than Seek Accommodation.
20. **Promiscuous** The Art of Gunnery. General Sea-Laws and Customs Relating to War, or
Learning. Commerce. The Original, and Natural History of Winds and Tides. Pro-
per Instructions for Reading Voyages and Travels, and for making Useful In-
quiries and Remarks by such as go Abroad. Fair Writing, Short-Hand ; and
whatever else may really Advance the Art of Navigation.

And to the End this New Method of Education, may be Truly Liberal, and
of Real Use and Benefit : It is further propos'd, That the aforeſaid Arts and Sci-
ences, shall be Taught in all the undermention'd Languages ; which are the
Chief of Those, wherein the Sciences Themselves are generally Treated of,
as They are also the Languages of Nations (except Latin, which is common
unto All) among whom the Greatest Part of Naval Commerce, both for
War, and Trafic, is Maintain'd.

The Languages are These, *Viz.*

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| 1. Latin. | }} 4. Spanish. | |
| 2. French. | | 5. Portuguese. |
| 3. Italian. | | 6. Dutch. |

*Nil habet Fortuna Magna Majus, nec Natura Bona Melius, quam
ut velit Benefacere quam Plurimis.*

SCHEME
For the Better Instruct-
ing of Youth in the
Art of Navigation
only.